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SHEPPARD, MULLIN, RICHTER & HAMPTON LLP
333 SOUTH HOPE STREET
48TH FLOOR
LOS ANGELES, CA 90071-1448

EXAMINER

BLEVINS, JERRY M

ART UNIT PAPER NUMBER

2883

DATE MAILED: 05/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,518

Applicant(s)

AOKI, SHIGENORI

Examiner

Jerry Martin Blevins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 May 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5/21/04, 3/28/05.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION***Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the at least one curved edge of the at least one electrode as claimed in claims 6 and 16 must be shown or the feature canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

The claims are objected to because the lines are crowded too closely together, making reading difficult. Substitute claims with lines one and one-half or double spaced on good quality paper are required. See 37 CFR 1.52(b).

Claim 17 is objected to because of the following informalities: "said electro-optical material" lacks antecedent basis since an electro-optical material is not claimed in the base claim 10. Claim 11 does claim an electro-optical material. Examiner interprets claim 17 as depending from claim 11. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 20, it is unclear which elements of the input side and output side are referenced. Examiner is unsure if the claim is to an index of refraction of the common waveguide that is less than the refractive indices of the input and output waveguides, the input and output lenses, or the input and output electro-optic material. Examiner interprets the claim to reference the input and output electro-optic material, which have indices of refraction dependent on the applied voltage.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 7-15, and 17-26 are rejected under 35 U.S.C. 102(e) as being anticipated by US Pre Grant Publication to Nishizawa et al, number 2003/0059148.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 1, Nishizawa teaches an optical deflection device for diverting the direction of light rays (paragraph 8) comprising: a plurality of deflecting elements (Figure 6, elements 40) comprising a first pair of deflecting elements (30A, 30B) and a second pair of deflecting elements (adjacent 30A, 30B), where each deflecting element comprises an electro-optic material (paragraphs 9, 10, 11, 14) and is defined by two electrodes of similar shape on opposite sides of the electro-optic material (paragraphs 9, 10, 11, 14, and Figure 6, elements 40), such that the index of refraction of the electro-optic material is controllably adjustable by applying a voltage difference to the electrodes (paragraphs 9, 10, 11, 14), where the first pair of deflecting elements and the

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second pair of deflecting elements are in a tilted relationship. (Figure 6 shows that elements 30A and 30B of each pair are in a tilted relationship).

Regarding 2, Nishizawa teaches the limitations of the base claim 1. Nishizawa also teaches that the adjacent surfaces of the first pair of deflecting elements are planar and parallel and that the adjacent surfaces of the second pair of deflecting surfaces are planar and parallel (Figure 6).

Regarding claim 3, Nishizawa teaches the limitations of the base claim 2. Nishizawa also teaches that the adjacent surfaces between the first and second pairs of deflecting elements are planar and parallel (Figure 6).

Regarding claim 4, Nishizawa teaches the limitations of base claim 1. Nishizawa also teaches that the electrodes are triangular (Figure 6 and paragraph 45).

Regarding claim 5, Nishizawa teaches the limitations of the base claim 1. Nishizawa also teaches that the edges of each electrode are straight (Figure 6 and paragraph 45).

Regarding claim 7, Nishizawa teaches the limitations of the base claim 1. Nishizawa also teaches that the electro-optic material is PZT, PLZT, or LN (paragraphs 5-7).

Regarding claim 8, Nishizawa teaches the limitations of the base claim 1. Nishizawa also teaches that the first pair and the second pair of deflecting elements have the same shape (triangular, Figure 6).

Regarding claim 9, Nishizawa teaches the limitations of the base claim 2. Nishizawa also teaches that the adjacent surfaces between the first and second pairs of

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deflecting elements are planar and parallel (Figure 6), and that the first pair and the second pair of deflecting elements have the same shape (triangular, Figure 6).

Regarding claim 10, Nishizawa teaches an optical switching module (paragraph 66) comprising: an input side (Figure 6, left side) having one or more input channels (waveguides 26) each adapted to accept an optical input, an output side (Figure 6, right side) having a plurality of output channels (waveguides 28) each adapted to deliver an optical output, and a common waveguide (22) disposed between the input side and output side, where at least input channel comprises a plurality of deflecting elements (40) comprising a first pair of deflecting elements (30A, 30B) and a second pair of deflecting elements (adjacent 30A, 30B) in a tilted relationship.

Regarding claim 11, Nishizawa teaches the limitations of the base claim 10. Nishizawa also teaches that each deflecting element comprises an electro-optic material (paragraphs 9, 10, 11, 14) and is defined by two electrodes of similar shape on opposite sides of the electro-optic material (paragraphs 9, 10, 11, 14, and Figure 6, elements 40), such that the index of refraction of the electro-optic material is controllably adjustable by applying a voltage difference to the electrodes (paragraphs 9, 10, 11, 14).

Regarding claim 12, Nishizawa teaches the limitations of the base claim 10. Nishizawa also teaches that the adjacent surfaces of the first pair of deflecting elements are planar and parallel and that the adjacent surfaces of the second pair of deflecting surfaces are planar and parallel (Figure 6).

Regarding claim 13, Nishizawa teaches the limitations of the base claim 12. Nishizawa also teaches that the adjacent surfaces between the first and second pairs of deflecting elements are planar and parallel (Figure 6).

Regarding claim 14, Nishizawa teaches the limitations of the base claim 11. Nishizawa also teaches that the electrodes are triangular (Figure 6 and paragraph 45).

Regarding claim 15, Nishizawa teaches the limitations of the base claim 11. Nishizawa also teaches that the edges of each electrode are straight (Figure 6 and paragraph 45).

Regarding claim 17, Nishizawa teaches the limitations of the base claim 11. Nishizawa also teaches that the electro-optic material is PZT, PLZT, or LN (paragraphs 5-7).

Regarding claim 18, Nishizawa teaches the limitations of the base claim 10. Nishizawa also teaches that the first pair and the second pair of deflecting elements have the same shape (triangular, Figure 6).

Regarding claim 19, Nishizawa teaches the limitations of the base claim 12. Nishizawa also teaches that the adjacent surfaces between the first and second pairs of deflecting elements are planar and parallel (Figure 6), and that the first pair and the second pair of deflecting elements have the same shape (triangular, Figure 6).

Regarding claim 20, Nishizawa teaches the limitations of the base claim 10. Nishizawa also teaches that the refractive index of the common waveguide is less than the refractive index of the input side and the refractive index of the output side (paragraphs 48 and 49 detail that the input and output electro-magnetic material can

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have indices of refraction different (greater than) than the index of refraction of the common waveguide).

Regarding claim 21, Nishizawa teaches a method for deflecting light beams in an optical switching module (paragraphs 66-69) having an input side (Figure 6, left side) with one or more input channels (waveguides 26) each adapted to accept an optical input, an output side (Figure 6, right side) with a plurality of output channels (waveguides 28) each adapted to deliver an optical output, and a common waveguide (22) disposed between the input and the output sides, where at least one input channel comprises a plurality of deflecting elements (40) comprising a first pair of deflecting elements (30A, 30B) and a second pair of deflecting elements (adjacent 30A, 30B) in a tilted relationship, the method comprising: controlling the deflection of a light beam at the input side from a selected input channel to a selected output channel by applying different voltages to the first pair of deflecting elements and the second pair of deflecting elements (paragraphs 50 and 69).

Regarding claim 22, Nishizawa teaches the limitations of the base claim 21. Nishizawa also teaches that the controlling further includes applying a voltage to the first pair of deflecting elements to deflect a select input to one of approximately two thirds of the plurality of optical channels. (Paragraphs 50 and 69 teach that signal light input to the input waveguide can be outputted to an arbitrary one of the output waveguides depending on the number of electrodes in which a voltage is applied.)

Regarding claim 23, Nishizawa teaches the limitations of the base claim 22. Nishizawa also teaches that the controlling further includes applying a voltage to the

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first pair of deflecting elements and to the second pair of deflecting elements to deflect a select input to one of approximately one thirds of the plurality of optical channels.

(Paragraphs 50 and 69 teach that signal light input to the input waveguide can be outputted to an arbitrary one of the output waveguides depending on the number of electrodes in which a voltage is applied.)

Regarding claim 24, Nishizawa teaches the limitations of the base claim 21.

Nishizawa also teaches at least one output channel comprises a plurality of deflecting elements (40) comprising a third pair of deflecting elements (30A, 30B) and a fourth pair of deflecting elements (adjacent 30A, 30B) in a tilted relationship (Figure 6), the method further comprising: controlling the deflection of a light beam at the output side from a selected input channel to a selected output channel by applying different voltages to the third pair of deflecting elements and the fourth pair of deflecting elements (paragraphs 50 and 69).

Regarding claim 25, Nishizawa teaches the limitations of the base claim 24.

Nishizawa also teaches that the controlling further includes applying a voltage to the third pair of deflecting elements to deflect a select input to one of approximately two thirds of the plurality of optical channels. (Paragraphs 50 and 69 teach that signal light input to the input waveguide can be outputted to an arbitrary one of the output waveguides depending on the number of electrodes in which a voltage is applied.)

Regarding claim 26, Nishizawa teaches the limitations of the base claim 25.

Nishizawa also teaches that the controlling further includes applying a voltage to the third pair of deflecting elements and to the fourth pair of deflecting elements to deflect a

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select input to one of approximately one thirds of the plurality of optical channels.

(Paragraphs 50 and 69 teach that signal light input to the input waveguide can be outputted to an arbitrary one of the output waveguides depending on the number of electrodes in which a voltage is applied.)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being obvious over Nishizawa in view of US Patent to Kulishov, number 6,353,690.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the

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application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

Regarding claims 6 and 16, Nishizawa teaches the limitations of the base claims 1 and 11, respectively, but does not teach that at least one edge of at least one electrode is curved. Kulishov teaches an electro-optic material with index of refraction dependent on the voltage applied to the electrodes (column 1, line 65 – column 2, line 2), wherein the electrodes are curved. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the curved electrodes of Kulishov into the switching module (deflection device) of Nishizawa. The motivation would have been to focus the input beam and correct for divergence.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry Martin Blevins whose telephone number is 571-272-8581. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached at 571-272-2415. The fax number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMB



Brian Healy
Primary Examiner